

CLAIMS

1. Polyester different-contraction commingled yarn comprising two different types of filaments with different boiling water shrinkage ratios, comprising 5 polyester polymer as the principal component individually,

wherein

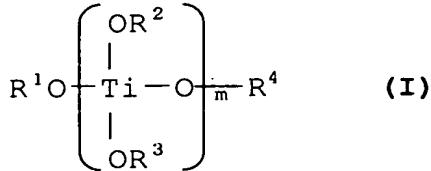
the polyester polymer is one produced by 10 polycondensation of an aromatic dicarboxylate ester in the presence of a catalyst,

the catalyst comprises at least one ingredient selected from among mixture (1) and reaction product (2) below,

15 the mixture (1) is a mixture of the following components (A) and (B):

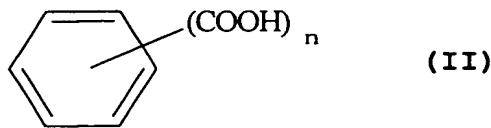
(A) a titanium compound component comprising at least one compound selected from the group consisting of:

(a) titanium alkoxides represented by the following general formula (I):



[wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> each independently represent one species selected from alkyl groups having 1 to 20 carbon atoms and phenyl group, m represents an integer of 1-4, and when m is an integer of 2, 3 or 4, the two, three or four R<sup>2</sup> and R<sup>3</sup> groups may be the same or different], and

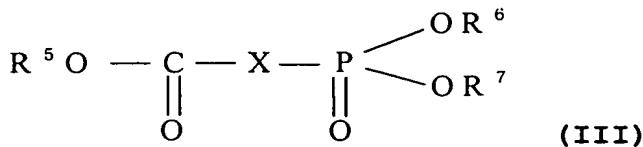
30 (b) reaction products of titanium alkoxides of general formula (I) above with aromatic polyvalent carboxylic acids represented by the following general formula (II):



[wherein n represents an integer of 2-4]

5 or their anhydrides, and

(B) a phosphorus compound component comprising at least one compound represented by the following general formula (III):



10

[wherein R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> each independently represent alkyl groups having 1 to 4 carbon atoms, and X represents at least one species selected from among -CH<sub>2</sub>- group and -CH<sub>2</sub>(Y) group (where Y represents phenyl group)],

15 the catalyst mixture (1) is used with a mixing ratio such that the ratio (%) M<sub>Ti</sub> of the millimoles of titanium element in the titanium compound component (A) with respect to the number of moles of the aromatic dicarboxylate ester and the ratio (%) M<sub>P</sub> of the millimoles of phosphorus element in the phosphorus compound component (B) with respect to the number of moles of the aromatic dicarboxylate ester satisfy the following expressions (i) and (ii):

20 25  $1 \leq M_p/M_{Ti} \leq 15$  (i)

$10 \leq M_p + M_{Ti} \leq 100$  (ii),

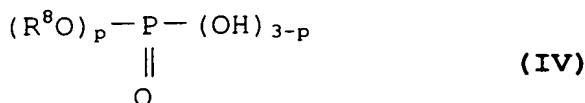
and the reaction product (2) is the reaction product of the following components (C) and (D):

25 (C) a titanium compound component comprising at least one compound selected from the group consisting of:

30 (c) titanium alkoxides represented by formula (I) above and

(d) reaction products of titanium alkoxides of general formula (I) above with aromatic polyvalent carboxylic acids represented by general formula (II) above or their anhydrides, and

5 (D) a phosphorus compound component comprising at least one phosphorus compound represented by the following general formula (IV):



10 [wherein  $\text{R}^8$  represents alkyl group having 1 to 20 carbon atoms or aryl group having 6 to 20 carbon atoms, and p represents an integer of 1 or 2].

15 2. Polyester different-contraction commingled yarn according to claim 1, wherein component (A) of the mixture (1) for the catalyst and component (C) of the reaction product (2) for the catalyst contain the respective titanium alkoxide (a) and titanium alkoxide (c) each in a reaction molar ratio in the range of 2:1 to 20 2:5 with respect to the aromatic polyvalent carboxylic acid represented by general formula (II) or its anhydride.

25 3. Polyester different-contraction commingled yarn according to claim 1 or 2, wherein in the reaction product (2) for the catalyst, the reaction ratio of component (D) with respect to component (C) is in the range of 1:1 to 3:1, in terms of the ratio of the moles of phosphorus atoms in component (D) to the moles of titanium atoms in component (C) (P/Ti).

30 4. Polyester different-contraction commingled yarn according to any one of claims 1 to 3, wherein the phosphorus compound of general formula (IV) used in the reaction product (2) for the catalyst is selected from among monoalkyl phosphates.

35 5. Polyester different-contraction commingled yarn according to any one of claims 1 to 4, wherein the

aromatic dicarboxylate ester is a diester produced by transesterification of an aromatic dicarboxylic acid dialkyl ester and an alkylene glycol ester in the presence of a titanium compound-containing catalyst.

5       6. Polyester different-contraction commingled yarn according to any one of claims 1 to 5, wherein the aromatic dicarboxylic acid is selected from among terephthalic acid, 1,2-naphthalenedicarboxylic acid, phthalic acid, isophthalic acid, diphenyldicarboxylic acid and diphenoxymethanedicarboxylic acid, and the alkylene glycol is selected from among ethylene glycol, butylene glycol, trimethylene glycol, propylene glycol, neopentyl glycol, hexanemethylene glycol and dodecanemethylene glycol.

10      15     7. Polyester different-contraction commingled yarn according to any one of claims 1 to 6, wherein the difference between the boiling water shrinkage ratios of the two filaments is 2% or greater.

20      25     8. Polyester different-contraction commingled yarn according to any one of claims 1 to 7, wherein both of the filaments are latent crimping conjugated filaments of two different polyester polymers conjugated in a side-by-side fashion or eccentric core-sheath fashion, the boiling water shrinkage ratio of one of the filaments is 0.5-8.0% and the boiling water shrinkage ratio of the other filaments is at least 10%.

30      35     9. Polyester different-contraction commingled yarn according to any one of claims 1 to 8, wherein the crimp ratio of the filaments with a high boiling water shrinkage ratio (high-shrinkage filaments) after boiling water treatment is at least 1.5%.

10. Polyester different-contraction commingled yarn according to any one of claims 1 to 9, wherein the filaments with a low boiling water shrinkage ratio (low-shrinkage filaments) are filaments taken up at a take-up speed of 2000-4000 m/min in melt spinning and objected to relaxation heat treatment.

11. Polyester different-contraction commingled yarn according to any one of claims 1 to 10, wherein the single filament size of the high-shrinkage filaments are larger than that of the low-shrinkage filaments, the 5 single filament size of the low-shrinkage filaments is 0.05-3.5 dtex, the single filament size of the high-shrinkage filaments is 0.55-15.0 dtex, and the difference in filament sizes is 0.5 dtex or greater.

10 12. Polyester different-contraction commingled yarn according to any one of claims 1 to 7, wherein the two different types of filaments are a polyester partially oriented yarn with a boiling water shrinkage ratio of no greater than 5% and a polyester yarn with a boiling water shrinkage ratio of 8% or greater.